

Abstract of the Disclosur

The invention relates to systems and methods of measuring low liquid flow rates. The system provides a controller, flow system components, and one or more load cells coupled to a collection vessel. The collection vessel includes a weir that serves as a passage to allow liquid to rise within the weir until the liquid overflows the weir. After the liquid supplied passes a hydraulic stabilization period the controller captures a load cell signal and opens a timing window. At the end of the timing window the controller captures another load cell signal. A controller calculates the mass of the collected liquid over the collection period and the flow rate such as mass rate and/or the volumetric rate. The duration of the timing window depends on the measurement desired. Since the liquid wells up and overflows the weir, the system can make precise measurements of low flow rates. In another feature, feedback control mechanisms are implemented in the batch constant flow method or steady state constant flow method. In both methods, the instantaneous measured flow rate is compared with an input command derived from flow rate calibration, sending an error correction feedback signal to the controlled valves to actuate the flow rate of liquid supply and the drain and the gas pressure, until zero error or an acceptable error margin is reached or the desired flow rate is established.